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10/550,704	07/13/2006	James Martin	14.0237-PCT-US	3099
28116	7590	01/05/2010	EXAMINER	
WesternGeco L.L.C.			BREIER, KRYSTINE E	
Kevin McEnaney			ART UNIT	
10001 Richmond Avenue			PAPER NUMBER	
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			01/05/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/550,704	<b>Applicant(s)</b> MARTIN ET AL.	
	<b>Examiner</b> Krystine Saito	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,10,12-16 and 21-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,10,12-16 and 21-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Response to Arguments***

1. Applicant's arguments with respect to claims 1, 10, 12-16, and 21-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1 and 21-29 are rejected under 35 USC 101 as being directed to non-statutory subject matter because these are method or process claims that do not transform underlying subject matter (such as an article or materials) to a different state or thing, nor are they tied to another statutory class (such as a particular machine). See *Diamond v. Diehr*, 450 U.S. 175, 184 (1981) (quoting *Benson*, 409 U.S. at 70); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978) (citing *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876)). See also *In re Bilski* (Fed Cir, 2007-1130, 10/30/2008) where the Fed. Cir. held that method claims must pass the "machine-or-transformation test" in order to be eligible for patent protection under 35 USC 101.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1, 10, 12, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach (6532190), in view of Varsamis (6366531) and Zhang (6611764).

6. With respect to claim 1, Bachrach teaches acquiring or retrieving from storage one or more acceleration wavefield traces (Col 3, lines 59-61; Col 4, lines 43-45); applying a normal moveout correction to the acceleration traces (Col 5, lines 15-16); muting the acceleration traces (Col 5, lines 13-14); and stacking the acceleration traces (Col 5, line 16). However, it does not teach applying a gain recover to the acceleration traces, and applying a time migration to the acceleration traces.

7. Varsamis teaches applying a gain recover to the acceleration traces (Col 11, lines 28-31, 36-46). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the gain recovery of Varsamis since such a modification would have improve the quality of the resultant data.

8. Zhang teaches applying a time migration to the acceleration traces (Col 2, lines 55-58; Col 7, lines 11-12; Col 10, lines 60-63; Col 11, lines 19-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the time migration of Zhang since such a modification would have ensured that events are associated with the correct times and depths thus giving a good model for the impedance boundaries.

9. With respect to claim 10, Bachrach teaches and input interface for receiving one or more acceleration wavefield traces (Col 4, lines 46-47); a data processor (Col 4, line

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49); acquiring or retrieving from storage one or more acceleration wavefield traces (Col 3, lines 59-61; Col 4, lines 43-45); applying a normal moveout correction to the acceleration traces (Col 5, lines 15-16); muting the acceleration traces (Col 5, lines 13-14); and stacking the acceleration traces (Col 5, line 16). However, it does not teach a memory comprising program instructions executable by a processor; applying a gain recover to the acceleration traces, and applying a time migration to the acceleration traces.

10. Varsamis teaches a memory comprising program instructions executable by a processor (Col 4, lines 10-24); applying a gain recover to the acceleration traces (Col 11, lines 28-31, 36-46). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the gain recovery of Varsamis since such a modification would have improve the quality of the resultant data.

11. Zhang teaches applying a time migration to the acceleration traces (Col 2, lines 55-58; Col 7, lines 11-12; Col 10, lines 60-63; Col 11, lines 19-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the time migration of Zhang since such a modification would have ensured that events are associated with the correct times and depths thus giving a good model for the impedance boundaries.

12. With respect to claim 12, Bachrach teaches a seismic source (Col 4, lines 42-43) and a seismic receiver (Col 4, line 45). Bachrach teaches the receiver being spaced from the source (Fig. 4), and teaches the apparatus as claimed in claim 10 (see above).

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13. With regards to claim 13, Bachrach as modified teaches the invention as discussed above. However, it does not teach the seismic source and the receiver are each disposed at one of the earth's surface.

14. Zhang teaches the seismic source and the receiver are each disposed at one of the earth's surface (Fig 2).

15. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach as modified to use the system of Zhang since such a modification would have allowed it to be used in a wider variety of applications.

16. With respect to claim 29, Bachrach teaches acquiring or retrieving from storage seismic data representative of only acceleration wavefield traces (Col 3, lines 59-61; Col 4, lines 43-45); applying a normal moveout correction to the seismic data (Col 5, lines 15-16); muting the seismic data (Col 5, lines 13-14); and stacking the seismic data (Col 5, line 16). However, it does not teach applying a gain recover to the seismic data, and applying a time migration to the seismic data.

17. Varsamis teaches applying a gain recover to the seismic data (Col 11, lines 28-31, 36-46). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the gain recovery of Varsamis since such a modification would have improve the quality of the resultant data.

18. Zhang teaches applying a time migration to the seismic data (Col 2, lines 55-58; Col 7, lines 11-12; Col 10, lines 60-63; Col 11, lines 19-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of

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Bachrach with the time migration of Zhang since such a modification would have ensured that events are associated with the correct times and depths thus giving a good model for the impedance boundaries.

19. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Eaton (6382332).

20. Bachrach as modified teaches the invention as discussed above. However it does not teach the seismic source is disposed at or on the earth's surface and the receiver is disposed within the borehole.

21. Eaton teaches the seismic source is disposed at or on the earth's surface (Col 6, lines 4-5; Fig 1: 16) and the receiver is disposed within the borehole (Col 3, lines 1-2; Fig 1: 14). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach as modified to use the system of Eaton since such a modification would have allowed it to be used in a wider variety of applications.

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Allen (6151556).

23. Bachrach as modified teaches the invention as discussed above. However it does not teach the seismic source is disposed in a water column and the receiver is located at the base of the water column.

24. Allen teaches the seismic source is disposed in a water column and the receiver is located at the base of the water column (Col 3, lines 33-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the

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method of Bachrach as modified to use the system of Allen since such a modification would have allowed it to be used in a wider variety of applications.

25. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Quinn (2004/0109389).

26. Bachrach as modified teaches the invention as discussed above. However it does not teach the seismic source is disposed in a water column and the receiver is disposed within a borehole.

27. Quinn teaches the seismic source is disposed in a water column and the receiver is disposed within a borehole ([0004], lines 2-3, 9-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach as modified to use the system of Quinn since such a modification would have allowed it to be used in a wider variety of applications.

28. Claims 21, 24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Berni (4520467).

29. Bachrach as modified teaches the invention as discussed above. However, Bachrach does not disclose removing an effect of a signature of the source used to acquire the seismic data; applying a trace equalization algorithm to the seismic data; and equalizing amplitudes of the stacked seismic data.

30. Berni teaches removing an effect of a signature of the source used to acquire the seismic data (Col 5, lines 51-53); applying a trace equalization algorithm to the seismic data (Col 4, lines 62-68; Col 5, lines 1-2); and equalizing amplitudes of the stacked

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seismic data (Col 2, lines 15-19, 24-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the steps of Berni since such a modification would have further removed noise from the seismic trace and provided a better image of the subsurface.

31. Claims 22, 23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Thomas (6430510).

32. Bachrach as modified teaches the invention as discussed above. However, it does not teach removing the coherent noise from the acceleration wavefield traces; applying a demultiple algorithm to remove events that involve multiple passes through a water column in which a receiver used to acquire the acceleration wavefield traces is disposed; and applying a post-stack deconvolution.

33. Thomas teaches removing the coherent noise from the acceleration wavefield traces (Col 11, lines 54-55); applying a demultiple algorithm to remove events that involve multiple passes through a water column in which a receiver used to acquire the acceleration wavefield traces is disposed (Fig 2: 240); and applying a post-stack deconvolution (Col 11, lines 56-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach with the steps of Thomas since such a modification would have reduced the noise on the traces and improved the signal-to-noise ratio.

34. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis and Zhang, and further in view of Schiflett (5642327).

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35. Bachrach as modified teaches the invention as discussed above. However, it does not teach applying a pre-stack deconvolution algorithm.

36. Schiflett teaches applying a pre-stack deconvolution algorithm (Col 9, line 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach to include the step of Schiflett since such a modification would have led to noise reduced data for further processing.

37. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachrach, in view of Varsamis, Zhang and Thomas, and further in view of Kamas (2004/0070529).

38. Bachrach as modified teaches the invention as discussed above. However, it does not teach applying a time-varying bandpass filter to the seismic data.

39. Kamas teaches applying a time-varying bandpass filter to the seismic data ([0026], lines 6-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bachrach to include the step of Kamas, since such a modification would have reduced the amount of computation necessary by providing only data in a useful frequency range.

### ***Conclusion***

The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystine Saito whose telephone number is 571-270-7614. The examiner can normally be reached on Monday thru Thursday, 8am-5:30pm EST and alternate Fridays 8am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. S./

Examiner, Art Unit 3663

/Scott A. Hughes/

Examiner, Art Unit 3663